

REMARKS

Claims 1-4, 6-8 and 10 are pending in this application. By this Amendment, claim 9 is canceled, claims 1-4 and 6-8 are amended, claim 5 is canceled, and new claim 10 is added. No new matter is added.

Personal Interview

Applicants thank the Examiner for the courtesies extended during a July 6, 2004, personal interview with Applicants' undersigned representative during which the outstanding rejections and objection of record were discussed. The remainder of Applicants' separate record of the personal interview is contained in the remarks set forth below.

Priority

As was discussed during the July 6, 2004, personal interview, the priority document was filed in the parent of the present application. The Examiner agreed to review this issue and acknowledge, in the next Patent Office paper, the previous filing of the priority document.

Claim Objections

The Office Action objected to claim 1 for asserted informalities. Applicants have amended claim 1 as suggested by the Examiner to obviate this objection. Reconsideration and withdrawal of the objection to claim 1 are thus respectfully requested.

The Office Action rejects claims 1, 2 and 5 under 35 U.S.C. § 102(a) as being anticipated by JP 2000-109792 as evidenced by Hawley's Condensed Chemical Dictionary, 14th Ed. Claim 4 is rejected under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP 2000-109792. Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 2000-109792. Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Steck et al. (U.S. Patent No. 5,464,700) in view of JP 2000-109792. Claims 7 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Steck et al. (U.S. Patent No. 5,464,700) in view of JP 2000-109792 as applied to claim 6 above, and further in view of Krasij et al. (U.S. Patent No. 5,110,691). These rejections are traversed as they may apply to the amended claims.

Amended claim 1 recites a liquid thermosetting sealing agent for a polymer electrolyte fuel cell comprising a lamination of separators and a membrane electrode assembly. The purpose of using the seal is to tightly seal gaps between each separator and the membrane electrode assembly. The seal is formed by thermally curing the liquid thermosetting sealing agent at a temperature in the range of from 100 to 130°C over a period of from 1 to 5 hours, **and the controlled temperature range thereof is a predetermined temperature $\pm 5^{\circ}\text{C}$.** The liquid thermosetting sealing agent is based on a silicone series elastomer or isobutylene series elastomer, and the viscosity of the liquid thermosetting sealing agent at the application is from 1,000 to 9,000 Pa.s.

JP 2000-109792 discloses a gasket material. The gasket material comprises a vulcanized molding product of a heat curling type perfluorether-based liquid fluororubber.

As was agreed during the July 6, 2004, personal interview, JP 2000-109792 does not teach or suggest the inclusion of silicone series elastomer or isobutylene series elastomer, as is required by the presently amended claims.

The JP 2000-109792 gasket has 50-50,000, more preferably, about 100-20,000 poise viscosity.

The vulcanization molding of the liquid fluorubber is carried out by heating the liquid fluorubber at about 100-200°C for about 2 to 20 minutes, and, if required, subjecting the rubber to oven vulcanization at about 150 to 200°C for about 1 to 5 hours.

In contrast, amended claim 1 discloses the liquid thermosetting sealing agent for a solid macromolecular type fuel cell comprising a lamination of separators and a membrane electrode assembly.

The liquid thermosetting sealing agent is thermally cured to form the seal under the condition that a temperature is in the range of from 100 to 130°C over a period of from 1 to 5 hours.

Generally, a seal is thermally cured at a temperature of approximately 150°C over a period of 1 hour. The purpose of the present invention is to thermally cure the sealing agent to form the seal at a temperature in the range of from 100 to 130°C over a period of from 1 to 5 hours. Specifically, in the case of the present invention, the temperature is lower than that of a general case, while the heating time is longer than that of a general case.

In order to gain the seal agent having the above characteristic, the viscosity of the sealing agent was defined as a range of from 1,000 to 9,000 Pa.s.

With such a configuration, the surface pressure during the lamination of separators and the membrane during the lamination of separators and the membrane electrode assembly makes it possible to secure high sealing properties and form a seal having a uniform size. For this reason, the liquid thermosetting sealing agent for a solid macromolecular type fuel cell configured as described above can form a highly durable seal even under severe conditions, such as a high temperature, a high humidity, and a highly acidic condition. (See page 11, lines 5 to 14 of the specification).

On the other hand, JP 2000-109792 fails to disclose the above purpose and advantage of the present invention.

JP 2000-109792 at [0015] discloses that a liquid heat-hardening type perfluoro ether system liquefied fluororubber is molded to form a gasket. In the molding, a liquefied fluororubber having a viscosity of 20000 poise is molded at 150°C for 4 hours, then the 2nd order constructs a bridge at 200°C for 4 hours.

Furthermore, the description at [0008] discloses that a vulcanization fabrication is performed for about 2-20 minutes at about 100-200°C, and the vulcanization of about 1-5 hours is also performed at about 150-200°C if needed after that.

Accordingly, the condition of thermally curing the liquid thermosetting sealing agent disclosed in the present invention is quite different from the condition of a vulcanization fabrication to form a gasket disclosed in JP 2000-109792.

As described above, JP 2000-109792 does not provide the same advantages of the sealing agent of amended claim 1. Thus, amended claim 1 is not anticipated by JP 2000-109792.

Furthermore, the present invention has a unique feature of the curing condition of the liquid thermosetting sealing agent and the seal formed by the curing condition. These features are not disclosed in JP 2000-109792. Therefore, JP 2000-109792 cannot obtain the advantage of the curing condition and the seal.

Specifically, the curing condition and the seal itself formed by said curing condition are patentable over JP 2000-109792.

Accordingly, even if the above-cited references are combined together, the combination thereof is missing elements of the present claims and such combination would not have obtained the same advantages achieved by the presently claimed invention. Thus, reconsideration and withdrawal of the rejections under 35 U.S.C. 102 and 103 are respectfully requested.

In view of the above remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance of the claims is earnestly solicited. Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper or credit any overpayment to Counsel's Deposit Account 01-2300, making reference to Attorney Docket No. 106145-00029.

Respectfully submitted,


Robert K. Carpenter
Robert K. Carpenter
Registration No. 34,794

Customer No. 004372
1050 Connecticut Avenue, N.W., Suite 400
Washington, D.C. 20036-5339
Tel: (202) 857-6000
Fax: (202) 638-4810
RKC/elz:tdd

Enclosure: Petition for Extension of Time

TECH/252045.1